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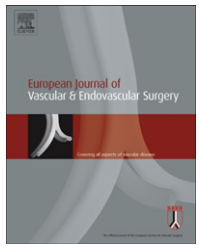

Residual Stumps Associated with Inguinal Varicose Vein Recurrences: A Multicenter Study

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Abstract *Purpose:* It is unclear whether a residual sapheno-femoral stump left in place after stripping of the great saphenous vein can contribute to the formation of late inguinal varicose vein recurrence. In order to obtain information about the time course of recurrence development, patients with histologically proven residual stumps were recruited and asked about the interval between the initial operation and the first clinical signs of varicose vein recurrence.
Methods: A multi-centre study involving 7 centres was conducted amongst patients undergoing redo-surgery for inguinal varicose vein recurrences. The sapheno-femoral stumps resected during the redo-surgery were classified histologically. Patients with a proven long residual sapheno-femoral stump were asked to describe the first signs of varicose vein recurrence with the help of a standardised questionnaire. From these data the symptom-free interval, consisting of the time frame between the initial operation and the first signs of recurrence, was determined.
Results: In 279 legs of 251 patients a long residual sapheno-femoral stump was present. Most patients had experienced a symptom-free interval after the initial operation with a mean duration of 7.4 S.D. 5.5 years. Recurrent varicose veins became apparent after a mean time

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interval of 6.3 S.D. 5.3 years and congestion symptoms occurred after a mean interval of 8.5 S.D. 5.7 years.
Conclusions: In patients with symptomatic groin recurrences, a long residual sapheno-femoral stump was found in about two thirds of cases. The first clinical signs of varicose vein recurrence can be expected 7–8 years after the initial treatment at the earliest. Long term follow up is required reliably to asses the outcome of treatment for varicose veins.

Introduction

Recurrent reflux in the groin after previous resection of the sapheno-femoral junction (SFJ) and stripping of the great saphenous vein (GSV) is a frequent problem with an incidence of up to 40% after 10 and 60% after 35 years.[1,2] One factor regarded as a cause of recurrent groin reflux is the presence of a residual GSV-stump left behind at the initial operation. In recent years, neovascularisation at the SFJ has emerged as another cause of groin recurrences.[3–5] There are controversial data in the literature as to what extent neovascularisation contributes to recurrent groin varicosities, ranging from 5%[6] to 95%.[7] Furthermore, with the event of endovenous ablation techniques, which routinely leave a residual GSV stump in place, the necessity of a flush ligation of the SFJ has been questioned.

With this background, the aim of our study was to find out what proportion of symptomatic groin recurrences were associated with a residual stump. We also evaluated the time course of recurrence development, i.e. the interval between leaving a residual stump at the initial operation and the actual appearance of a groin recurrence.

Material and Methods

A multi-centre study involving 7 centres located throughout Germany (Bad Bertrich, Bochum, Freiburg, Magdeburg, München, Saarlouis, Stade) was conducted after approval of the study protocol by the ethics committee of the Ruhr-University Bochum. All participating centres had a large experience with varicose vein surgery including redo-procedures. Consecutive patients undergoing surgery for symptomatic groin recurrence after SFJ resection and stripping of the GSV were included in the study. The incompetent inguinal vessels were demonstrated by duplex ultrasound imaging. Only recurrences with a total diameter of at least 5 mm were considered haemodynamically relevant and underwent surgery. At the time of surgery, incompetent veins in the groin were interrupted at the level of the deep vein, then dissected out as far distally as possible. The vessel was then resected and the specimen was placed in formalin and sent for histological evaluation.

The details of the histological techniques have been described previously.[8] Briefly, after fixation and embedding in paraffin, three consecutive 5-μm to 6-μm sections of vein were cut, mounted on slides, preserved with routine histological methods and then stained with haematoxylin-eosin and elastica-van Gieson stains.

Histological criteria characterising a residual stump or neovascularisation are listed in Table 1.

Patients with histological proof of a residual stump as cause of their recurrence underwent further evaluation. With the help of a standardised questionnaire they were asked to state how long the time interval was between the initial operation and the first signs of recurrent varicose veins and venous stasis symptoms.

Results

Between April of 2005 and March of 2006, a total of 458 legs of 419 patients (372 female, 86 male, mean age 56.6 years, S.D. 10.6 years) were included in the study. Clinical symptoms, according to the CEAP classification,[9] were distributed as follows: C2 51.1%, C3 22.5%, C4 22.2%, C5 3.3% and C6 0.8%. The initial operation had been performed 13.6 years (S.D. 10.6 years) earlier. The mean diameter of the incompetent groin vessels, measured preoperatively with the patient standing using duplex ultrasound imaging, was 8.5 mm (S.D. 3.0 mm). 427 specimen (93%) reached the laboratory and underwent histological evaluation. 279 of those (65%), belonging to 251 patients (202 female, 49 male, mean age 55.9 years, S.D. 10.6 years) were classified as a residual stump. There was no difference between the entire study population, the group with residual stumps and the group without residual stumps in terms of demographics, symptoms, time of the initial procedure or diameter of the refluxing groin vessel (Table 2).

In evaluating the time course of recurrence development, patients with a residual stump described a symptom-free interval since the initial procedure of 7.4 years (S.D. 5.5 years), with the freedom from recurrent varicose veins being 6.3 years (S.D. 5.3 years) and the freedom from venous symptoms being 8.5 years (S.D. 5.7 years). This was similar in the group of patients without evidence of a residual stump, where the symptom-free interval was 7.2 years (S.D. 5.2 years) with freedom from varicose veins at 6.5 years (S.D. 5.5 years) and freedom from venous stasis at 8.2 years (S.D. 5.1 years).

Table 1 Histological criteria used to differentiate between neovascularisation and residual stumps

Neovascularisation	Residual stump
Incomplete wall structure	Three-layered wall
Absence of valves and nerve fibres	Venous valves
Bizarre form of lumen	Intramural nerve fibres
Multiple channel recurrence	Single channel recurrence

Table 2 Characteristics of the entire study population as well as of the subgroups of patients with and without residual stumps. Figures for age, time frame and diameter are the mean and standard deviation with the range in parenthesis

	Entire study population	Residual stumps	No residual stump
Number	458	279	148
Male/female	86/372	57/222	27/121
Age [years]	56.6 S.D. 10.6 (25—86)	55.9 S.D. 10.6 (27—86)	57.1 S.D. 10.3 (25—86)
Time since initial operation [years]	13.6 S.D. 10.6 (3—48)	13.3 S.D. 10.4 (3—45)	13.8 S.D. 10.3 (4—48)
Diameter of groin recurrence [mm]	8.5 S.D. 3.0 (3—22)	8.6 S.D. 2.8 (4.2—22)	8.2 S.D. 2.6 (3—18)
CEAP class C2	51.1%	51.1%	50.3%
C3	22.5%	22.2%	23.8%
C4	22.2%	22.7%	22.4%
C5	3.3%	3.6%	2.9%
C6	0.8%	0.4%	0.6%

Discussion

Resection of the sapheno-femoral junction at the level of the femoral vein in combination with stripping of the great saphenous vein has been the standard surgical procedure for varices arising from GSV incompetence. Randomised studies have shown this technique to be superior to sapheno-femoral ligation of the GSV without stripping in terms of limiting varicose vein recurrence.[10] Although never proven by a randomised study, long-lasting experience with varicose vein surgery has led to the postulate that resection of the SFJ should be done as close to the femoral vein as possible, without leaving a long residual stump. The rationale behind this technique is the assumption that such a long residual stump will be affected by refluxing blood from the femoral vein, which with time will cause further dilatation and incompetence of the stump and its branches, resulting in recurrent varicose veins.

In recent years, several developments have challenged this traditional view. The presence of neovascularisation, newly formed venous vessels at the previous SFJ, has been recognised as a cause for groin recurrence.[3—5,7] These new vessels can occur despite flush resection of the SFJ and therefore cannot be prevented by a correct surgical technique. In fact, there are theories that surgery itself, by inducing scar tissue formation, might cause neovascularisation.[2] Furthermore, with the introduction of endovenous ablation of the GSV, either by laser or thermal energy,[11,12] the principle of flush resection of the SFJ has been ignored. The endovenous techniques leave a residual stump of the GSV of up to 5 cm in length.[13] Proponents of the technique argue that this stump and its tributaries become competent after GSV ablation, thereby allowing antegrade draining of venous blood from epigastric and pubic veins, which in return might - in combination with the lack of scar tissue — prevent neovascularisation.[13] The short-term results of endovenous treatment have been promising.[11,14,15] There are, however, currently no long-term data available with a follow up of over 5 years.

Considering this background, our study has two important findings: first, a long residual stump left in place at the initial operation seems to be associated with groin recurrence in the long-term. In about two thirds of the cases with symptomatic inguinal reflux in our study population the presence of a residual stump was demonstrated histologically. This finding has to be interpreted with caution, since, due to the retrospective character of our study, we do not have any information about what proportion of patients was left with a residual stump at the initial operation. However, taking into account that flush ligation of the SFJ has been the surgical standard for the last few decades, it can be assumed that the numbers of patients with a long residual stump versus those with flush ligation of the SFJ at the initial procedure were even at the very least; it is even more likely that a flush ligation was performed in the majority of cases. If you then take a large, unselected group of consecutive patients with groin recurrences and find signs of a residual stump to be present in 65% of cases, it leads to the conclusion that a residual stump is a factor which is associated with late symptomatic groin recurrence. This is further underlined by the fact that there were no differences in patient characteristics between the residual stump group and the rest of the patients, so there seems to be no other factors explaining the high proportion of residual stumps in patients with recurrences.

Our findings do not challenge the role of neovascularisation, which still might be the main cause of recurrence after a correctly performed operation. In fact, by including only groin recurrences with a maximum diameter of at least 5 mm, we probably underestimated the incidence of neovascularisation.

The second important finding is that it does take a mean of 8 to 9 years for a symptomatic groin recurrence to develop after the initial operation.

These results have implications for endovenous ablation of the GSV. Even though there is evidence that the ''endovenous stump'' and its tributaries remain competent at 1 year follow-up,[16] there is a chance that this might change with time. It is conceivable that the residual vein segment might degenerate over the course of time, become incompetent and then cause recurrence, just as it can be seen for GSV-stumps left after incomplete surgery. Based on the results of our study, this process might very well take several years. Therefore, in our opinion follow-up after endovenous operations should be extended to at least five years after the procedure in order to reliably asses outcome.

There are some limitations of our study. Many patients could not remember exactly when they first noticed recurrent veins or symptoms, thereby causing inaccuracy in defining the symptom-free interval. However, the time of the initial procedure was known by almost all patients. Considering that the initial operation dated back a mean of 13.5 years, a symptom-free interval of 8 to 9 years seems realistic or even underestimated. Using histological analysis of the recurrent veins to classify the type of recurrence has its limitations. However, we believe that this is the most precise and objective method to

distinguish between the two entities. By defining clear, reproducible criteria such as the presence or absence of a structured vein wall and venous valves,[8] subjective, investigator-dependent factors can be omitted. These might, for example, influence the way a duplex-ultrasound picture is interpreted. Furthermore, we showed in a previous study that macroscopic evaluation alone is not reliable in distinguishing residual stumps and neovascularisation.[17]

In summary, our study, which included a large, representative population of patients with symptomatic groin recurrences after GSV stripping, showed that a residual stump left in place at the initial operation seems to be associated with recurrent varicose veins and symptoms. The time to recurrence development was 7 to 9 years in the majority of patients. Our results suggest that longer follow-up after endovenous procedures has to be obtained before the fate of the residual stump left by these procedures can be established with certainty.

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